SEQUENCE LISTING

<110> Godfroi, Edmond
Bollen, Alex
Leboulle, Gerard

<120> IDENTIFICATION AND MOLECULAR CHARACERIZATION OF PROTEINS, EXPRESSED IN THE IXODES RICINUS SALIVARY GLANDS

<130> VANM229.001CP1

<140>
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<150> PCT/BE00/00061
<151> 2000-06-06

<150> GB 9913425.6
<151> 1999-06-09

<160> 34

<170> FastSEQ for Windows Version 3.0

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tcgacgtagc tcctgactag aaactcgtcg gctaggacag aacttttctt caggtttagc 180
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tcgcaaatgc acttcccgtg cttgtcgcat ttcgccccaa aagcgcatgg cattccttcc 180
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ggagaaaaat gggtgcaacg gggggatcag cgtttgtact tgcaaacatt tgtggagacg 480
gtaaaccwgt atttcgcgga actcagatgc tccagcgtga agctcgtctt aataaaagtt 540

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cataagttaa accctgtcat tataagtgtg attgccgtat ctcggctgaa tgggttccat 180
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tcatcgtata tcttcgcct 259

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Val Asp Thr Ala Asn His Lys Gly Arg Gly Arg Pro Ala Lys Cys Lys
20 25 30

ctt cct ccg gac gac gga cca tgc aga gca cga att ccg agt tac tac 144
Leu Pro Pro Asp Asp Gly Pro Cys Arg Ala Arg Ile Pro Ser Tyr Tyr
35 40 45

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Phe Asp Arg Lys Thr Lys Thr Cys Lys Glu Phe Met Tyr Gly Gly Cys
50 55 60

gaa gga aac gaa aac aat ttt gaa aac ata act acg tgc caa gag gaa 240
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Cys Arg Ala Lys Lys Val
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35 40 45

Phe Asp Arg Lys Thr Lys Thr Cys Lys Glu Phe Met Tyr Gly Gly Cys
50 55 60

Glu Gly Asn Glu Asn Asn Phe Glu Asn Ile Thr Thr Cys Gln Glu Glu
65 70 75 80

Cys Arg Ala Lys Lys Val
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tccatttgga atcatagaaa catctttcag tttgaatatt gtagcgataa taatcggtat 240
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atctcacgga tggatgtgtg acacttttat atctcaggtt tgccgacatt gccattacag 180
ataaatagtt gataatttct ttcttgttat agttgtaagc agcgcatgtt gttgcatcaa 240
gcaccacatg cacttcaggc aatatggttt 270

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acgccaatag gggttctcgc aaagaacata tcatttggag gaaggcgtag tccgtcgaga 180
tatcccaaaa ctagggtttc attgcgtgcg aaccaactgc ccccacttct gtatgtgtac 240
tgtaaggagt rgttgaacgg ygtcctcttt cccataacct tgaagttttc acactgcaga 300
ggattacctc tcaaaa 316

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<212> DNA
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cattcctcac cgtatacccg tcatccaacg tcaattgtgt tacaaggcag ataatgtcaa 120
aatggctctg gtccctataa tagtcggata atgtagaaat cgctccatgt ggccaaatag 180
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ccacccagtt tgaaagtgca agaacgcaca gtggtttacc gtaacaagta caccagagtt 180
cctgtaaatt ttaccgtcga agttgccatg ctgattgata agtatttata cwaggagttc 240
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tatgccgaca cacatgaccc gtacatccag tttcttctca cacaagtgtt cgtggggaaw 360
wctggcgatc atatgggcca catgcccttc cgacgagcgt tcttgttcag gcgccggcat 420
tatgcgcagt ttaggcccaa tmacaccttc cacttgtaat tctccgttgt tggatagtgt 480
aagtgaggcc attgcatcag catcgtggaa gargccttcc tccaagtagg aaccgcccat 540
ttaggtttgc tttcccaatc cgccaattta anttttaaaa aaaattcccc ccccaaaaat 600
taatttttt taaaggtgga ttgtgatttc tccgtt 636

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actgcctcta caaagtcaat gccaaggatg ctgtaaaaag cctaatatct ctgcccggat 180
ttaggatatc gccaacgagt ttctgtcaat ttatgcatcc gctttaccgc ggtgtccata 240
gcgataagaa agcaggtctg tccgattgcg tacagacgtg tagaacggcc aaaaatcgac 300
gaggaggcta ccattcatgg attcacgcgg cacttgacgg ggttccttgc gacaagagaa 360
accccaagaa ggcctgcata aacgggaaat gcaccctcct taagagcatg ccccacagaa 420
cgtaccggga at 432

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catcctcgtc ttttaggatg actgccgcca tttgttttgt atcgtggtac aggtgtttgt 180
tatggtccga gccgtcgaca taagtattga ccaacgatcg gccgaatgat tacggctcac 240
caaacacatc aaatacccca gtcaagtcaa gagctggaag cacaaagcat agtatgtaca 300
agataccctt ggaaatcttt cccgaagttc accttgtggt ggacagcaca tttgccaaag 360
cttttaaatt tgacgtgtac aaagtaacgc gttacttcgc agtgcttaca aatgcggcta 420
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gtatgtaggg tcagcgtgca tgccttcgtc gtacatatac accctctgac agtagttgct 180
cagtgttgtc atcctaccag gaagcttaga cgaacgtttt attgtttttg tcgtgtatcg 240
ttctctaagg catttgaatt ccggacggtt gtagaggttc ctgacttctc gctggcagca 300
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Ser Gly Leu Ser Leu Lys Leu Trp Ile Val Ala Phe Phe Ser Phe Cys
              5                  10                  15

ttg gcc gag aaa gag cat ggg atc gtg tac ccc agg atg ctt gaa agc   152
Leu Ala Glu Lys Glu His Gly Ile Val Tyr Pro Arg Met Leu Glu Ser
         20                  25                  30

aga gca gca act gga gag aga atg ctt aaa atc aac gat gac ctg acg   200
Arg Ala Ala Thr Gly Glu Arg Met Leu Lys Ile Asn Asp Asp Leu Thr
     35                  40                  45

ttg acg ctg cag aag agt aag gtc ttc gct gac gac ttt ctc ttc agc   248
Leu Thr Leu Gln Lys Ser Lys Val Phe Ala Asp Asp Phe Leu Phe Ser
 50                  55                  60                  65

acg acc gac gga att gaa cct att gat tac tac atc aaa gcc gaa gac   296
Thr Thr Asp Gly Ile Glu Pro Ile Asp Tyr Tyr Ile Lys Ala Glu Asp
                 70                  75                  80

gct gaa cgt gac atc tac cac gac gca act cac atg gca tca gta agg   344
Ala Glu Arg Asp Ile Tyr His Asp Ala Thr His Met Ala Ser Val Arg
             85                  90                  95

gta acg gac gat gat ggc gtg gaa gtg gaa gga att ctt gga gag agg   392
Val Thr Asp Asp Asp Gly Val Glu Val Glu Gly Ile Leu Gly Glu Arg
        100                 105                 110

ctt cgt gtt aaa cct ttg ccg gca atg gcc cgc agc agc gat ggc ctc   440
Leu Arg Val Lys Pro Leu Pro Ala Met Ala Arg Ser Ser Asp Gly Leu
    115                 120                 125

aga ccg cat atg ttg tac gaa gtc gac gca cac gaa aac ggc cgg cca   488
Arg Pro His Met Leu Tyr Glu Val Asp Ala His Glu Asn Gly Arg Pro
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130                 135                 140                 145

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                150                 155                 160

gct gga ggc aca gaa ccc cag atg tac aag ata cca gcg gaa atc tat   584
Ala Gly Gly Thr Glu Pro Gln Met Tyr Lys Ile Pro Ala Glu Ile Tyr
            165                 170                 175

ccc gaa gtt tac ctt gtg gcg gat agt gcc ttt gcc aaa gaa ttt aac   632
Pro Glu Val Tyr Leu Val Ala Asp Ser Ala Phe Ala Lys Glu Phe Asn
        180                 185                 190

ttt gat gtg aac gcc gtt acg cgt tac ttc gca gtg ctt aca aat gcg   680
Phe Asp Val Asn Ala Val Thr Arg Tyr Phe Ala Val Leu Thr Asn Ala
    195                 200                 205

gct aat ctt agg tat gaa agc ttc aaa tct cca aag gta cag ctc agg   728
Ala Asn Leu Arg Tyr Glu Ser Phe Lys Ser Pro Lys Val Gln Leu Arg
210                 215                 220                 225

atc gtt ggc ata acg atg aac aaa aac cca gca gac gag cca tac att   776
Ile Val Gly Ile Thr Met Asn Lys Asn Pro Ala Asp Glu Pro Tyr Ile
                230                 235                 240

cac aat ata cgg gga tat gag cag tac cgg aat att ttg ttt aag gaa   824
His Asn Ile Arg Gly Tyr Glu Gln Tyr Arg Asn Ile Leu Phe Lys Glu
            245                 250                 255

aca ctg gag gat ttc aac act cag atg aag tca aaa cat ttt tat cgt   872
Thr Leu Glu Asp Phe Asn Thr Gln Met Lys Ser Lys His Phe Tyr Arg
        260                 265                 270

act gcc gat atc gtg ttt ctc gtg aca gca aaa aat atg tcc gaa tgg   920
Thr Ala Asp Ile Val Phe Leu Val Thr Ala Lys Asn Met Ser Glu Trp
    275                 280                 285

gtt ggt agc aca cta caa tca tgg act ggc ggg tac gct tac gta gga   968
Val Gly Ser Thr Leu Gln Ser Trp Thr Gly Gly Tyr Ala Tyr Val Gly
290                 295                 300                 305

aca gcg tgt tcc gaa tgg aaa gta gga atg tgt gaa gac cga ccg aca   1016
Thr Ala Cys Ser Glu Trp Lys Val Gly Met Cys Glu Asp Arg Pro Thr
                310                 315                 320

agc tat tac gga gct tac gtt ttc gcc cat gag ctg gcg cat aat ttg   1064
Ser Tyr Tyr Gly Ala Tyr Val Phe Ala His Glu Leu Ala His Asn Leu
            325                 330                 335

ggt tgt caa cac gat gga gat ggt gcc aat agc tgg gtg aaa ggg cac   1112
Gly Cys Gln His Asp Gly Asp Gly Ala Asn Ser Trp Val Lys Gly His
        340                 345                 350

atc gga tct gcg gac tgc cca tgg gat gac gga tac ctt atg agc tac   1160
Ile Gly Ser Ala Asp Cys Pro Trp Asp Asp Gly Tyr Leu Met Ser Tyr
    355                 360                 365
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aag atg gaa gac gag cgc cag tat aag ttt tct ccc tac tgc cag aga   1208
Lys Met Glu Asp Glu Arg Gln Tyr Lys Phe Ser Pro Tyr Cys Gln Arg
370                 375                 380                 385

gaa gtc agg aac ctc tac agg cgt ccg gaa ttc aaa tgc ctc act gaa   1256
Glu Val Arg Asn Leu Tyr Arg Arg Pro Glu Phe Lys Cys Leu Thr Glu
                390                 395                 400

cga aaa gcg aaa aaa aca atc cgc tcg tct aag cta cct ggt gtg atg   1304
Arg Lys Ala Lys Lys Thr Ile Arg Ser Ser Lys Leu Pro Gly Val Met
            405                 410                 415

aca tca tcg agc aac tat tgc cgg agg gtg tac atg tac gaa aaa ggc   1352
Thr Ser Ser Ser Asn Tyr Cys Arg Arg Val Tyr Met Tyr Glu Lys Gly
        420                 425                 430

atg cac gcc gac gag gca tat ggc gtc aag gac tgc agg gta aaa tgc   1400
Met His Ala Asp Glu Ala Tyr Gly Val Lys Asp Cys Arg Val Lys Cys
    435                 440                 445

acc acc aca tca aga atg tat tgg cta ctc ggt gta gtc gac ggt aca   1448
Thr Thr Thr Ser Arg Met Tyr Trp Leu Leu Gly Val Val Asp Gly Thr
450                 455                 460                 465

cct tgc gga aat gga aag gct tgc att ctt ggg aaa tgc agg aac aaa   1496
Pro Cys Gly Asn Gly Lys Ala Cys Ile Leu Gly Lys Cys Arg Asn Lys
                470                 475                 480

atc aaa ata agc aag aag gac tgagaggttg ataatatcaa attaatcatg      1547
Ile Lys Ile Ser Lys Lys Asp
            485

atatttcaac cacatgactt cgtgctcaac tggtagcccc aaataaattt taaaaaaaat 1607

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atg                                                               1670
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<212> PRT
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Ser Arg Ala Ala Thr Gly Glu Arg Met Leu Lys Ile Asn Asp Asp Leu
         35                  40                  45

Thr Leu Thr Leu Gln Lys Ser Lys Val Phe Ala Asp Asp Phe Leu Phe
     50                  55                  60
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Ser Thr Thr Asp Gly Ile Glu Pro Ile Asp Tyr Tyr Ile Lys Ala Glu
 65                  70                  75                  80

Asp Ala Glu Arg Asp Ile Tyr His Asp Ala Thr His Met Ala Ser Val
                 85                  90                  95

Arg Val Thr Asp Asp Asp Gly Val Glu Val Glu Gly Ile Leu Gly Glu
            100                 105                 110

Arg Leu Arg Val Lys Pro Leu Pro Ala Met Ala Arg Ser Ser Asp Gly
        115                 120                 125

Leu Arg Pro His Met Leu Tyr Glu Val Asp Ala His Glu Asn Gly Arg
    130                 135                 140

Pro His Asp Tyr Gly Ser Pro Asn Thr Thr Asn Thr Pro Val Glu Arg
145                 150                 155                 160

Arg Ala Gly Gly Thr Glu Pro Gln Met Tyr Lys Ile Pro Ala Glu Ile
                165                 170                 175

Tyr Pro Glu Val Tyr Leu Val Ala Asp Ser Ala Phe Ala Lys Glu Phe
            180                 185                 190

Asn Phe Asp Val Asn Ala Val Thr Arg Tyr Phe Ala Val Leu Thr Asn
        195                 200                 205

Ala Ala Asn Leu Arg Tyr Glu Ser Phe Lys Ser Pro Lys Val Gln Leu
    210                 215                 220

Arg Ile Val Gly Ile Thr Met Asn Lys Asn Pro Ala Asp Glu Pro Tyr
225                 230                 235                 240

Ile His Asn Ile Arg Gly Tyr Glu Gln Tyr Arg Asn Ile Leu Phe Lys
                245                 250                 255

Glu Thr Leu Glu Asp Phe Asn Thr Gln Met Lys Ser Lys His Phe Tyr
            260                 265                 270

Arg Thr Ala Asp Ile Val Phe Leu Val Thr Ala Lys Asn Met Ser Glu
        275                 280                 285

Trp Val Gly Ser Thr Leu Gln Ser Trp Thr Gly Gly Tyr Ala Tyr Val
    290                 295                 300

Gly Thr Ala Cys Ser Glu Trp Lys Val Gly Met Cys Glu Asp Arg Pro
305                 310                 315                 320

Thr Ser Tyr Tyr Gly Ala Tyr Val Phe Ala His Glu Leu Ala His Asn
                325                 330                 335

Leu Gly Cys Gln His Asp Gly Asp Gly Ala Asn Ser Trp Val Lys Gly
            340                 345                 350

His Ile Gly Ser Ala Asp Cys Pro Trp Asp Asp Gly Tyr Leu Met Ser
        355                 360                 365
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Tyr Lys Met Glu Asp Glu Arg Gln Tyr Lys Phe Ser Pro Tyr Cys Gln
370 375 380

Arg Glu Val Arg Asn Leu Tyr Arg Arg Pro Glu Phe Lys Cys Leu Thr
385 390 395 400

Glu Arg Lys Ala Lys Lys Thr Ile Arg Ser Ser Lys Leu Pro Gly Val
405 410 415

Met Thr Ser Ser Ser Asn Tyr Cys Arg Arg Val Tyr Met Tyr Glu Lys
420 425 430

Gly Met His Ala Asp Glu Ala Tyr Gly Val Lys Asp Cys Arg Val Lys
435 440 445

Cys Thr Thr Thr Ser Arg Met Tyr Trp Leu Leu Gly Val Val Asp Gly
450 455 460

Thr Pro Cys Gly Asn Gly Lys Ala Cys Ile Leu Gly Lys Cys Arg Asn
465 470 475 480

Lys Ile Lys Ile Ser Lys Lys Asp
485

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ttcggaactt ccactccaac ttggcgagcc gtggattttg acttctcgtg atgctccacc 120
agacagttgc aggacttcag ctgcctagat ggagcctt 158

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attccaantg tctgaccgaa ccgcga 146

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<220>
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<223> A,C,T or G

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aatgagttgt caaatgacat 140

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tgtgatatta magttcctag 140

<210> 24
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<212> DNA
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tgctaagaac ttcacacttt gcaagaagtw ccaaaatgaa agccgcgatg accgatgatt 120
tagcttccat cttctatcac ttga 144

<210> 25
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<212> DNA
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ttacaccaat ggcgctgcgt ggtgcgtggt gattt 95

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atatcctgtt attaagctct aattagcaca ctgtgagtcg atcagaggcc tctcttaacg 120

ccacattgaa aaaggatcca ag atg gag gca agt ctg agc aac cac atc ctt 172
Met Glu Ala Ser Leu Ser Asn His Ile Leu
1 5 10

aac ttc tcc gtc gac cta tac aag cag ctg aaa ccc tcc ggc aaa gac 220
Asn Phe Ser Val Asp Leu Tyr Lys Gln Leu Lys Pro Ser Gly Lys Asp
15 20 25

acg gca gga aac gtc ttc tgc tca cca ttc agt att gca gct gct ctg 268
Thr Ala Gly Asn Val Phe Cys Ser Pro Phe Ser Ile Ala Ala Ala Leu
30 35 40

tcc atg gcc ctc gca gga gct aga ggc aac act gcc aag caa atc gct 316
Ser Met Ala Leu Ala Gly Ala Arg Gly Asn Thr Ala Lys Gln Ile Ala
45 50 55

gcc atc ctg cac tca aac gac gac aag atc cac gac cac ttc tcc aac 364
Ala Ile Leu His Ser Asn Asp Asp Lys Ile His Asp His Phe Ser Asn
60 65 70

ttc ctt tgc aag ctt ccc agt tac gcc cca gat gtg gcc ctg cac atc 412
Phe Leu Cys Lys Leu Pro Ser Tyr Ala Pro Asp Val Ala Leu His Ile
75 80 85 90

gcc aat cgc atg tac tct gag cag acc ttc cat ccg aaa gcg gag tac 460
Ala Asn Arg Met Tyr Ser Glu Gln Thr Phe His Pro Lys Ala Glu Tyr
95 100 105

aca acc ctg ttg caa aag tcc tac gac agc acc atc aag gct gtt gac 508

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Thr Thr Leu Leu Gln Lys Ser Tyr Asp Ser Thr Ile Lys Ala Val Asp
            110                 115                 120

ttt gca gga aat gcc gac agg gtc cgt ctg gag gtc aat gcc tgg gtt   556
Phe Ala Gly Asn Ala Asp Arg Val Arg Leu Glu Val Asn Ala Trp Val
        125                 130                 135

gag gaa gtc acc agg tca aag atc agg gac ctg ctc gca cct gga act   604
Glu Glu Val Thr Arg Ser Lys Ile Arg Asp Leu Leu Ala Pro Gly Thr
    140                 145                 150

gtt gat tca tcg aca tca ctt ata tta gtg aat gcc att tac ttc aaa   652
Val Asp Ser Ser Thr Ser Leu Ile Leu Val Asn Ala Ile Tyr Phe Lys
155                 160                 165                 170

ggt ctg tgg gat tct cag ttc aag cct agt gct acg aag ccg gga gat   700
Gly Leu Trp Asp Ser Gln Phe Lys Pro Ser Ala Thr Lys Pro Gly Asp
                175                 180                 185

ttt cac ttg aca cca cag acc tca aag aaa gtg gac atg atg cac cag   748
Phe His Leu Thr Pro Gln Thr Ser Lys Lys Val Asp Met Met His Gln
            190                 195                 200

gaa ggg gac ttc aag atg ggt cac tgc agc gac ctc aag gtc act gcg   796
Glu Gly Asp Phe Lys Met Gly His Cys Ser Asp Leu Lys Val Thr Ala
        205                 210                 215

ctt gag ata ccc tac aaa ggc aac aag acg tcg atg gtc att ctc ctg   844
Leu Glu Ile Pro Tyr Lys Gly Asn Lys Thr Ser Met Val Ile Leu Leu
    220                 225                 230

ccc gaa gat gta gag gga ctc tca gtc ctg gag gaa cac ttg acc gct   892
Pro Glu Asp Val Glu Gly Leu Ser Val Leu Glu Glu His Leu Thr Ala
235                 240                 245                 250

ccg aaa ctg tcg gct ctg ctc ggc ggc atg tat gcg acg tcc gat gtc   940
Pro Lys Leu Ser Ala Leu Leu Gly Gly Met Tyr Ala Thr Ser Asp Val
                255                 260                 265

aac ttg cgc ttg ccg aag ttc aaa cta gag cag tcc ata ggt ttg aag   988
Asn Leu Arg Leu Pro Lys Phe Lys Leu Glu Gln Ser Ile Gly Leu Lys
            270                 275                 280

gat gta ctg atg gcg atg gga gtc aag gat ttc ttc acg tcc ctt gca   1036
Asp Val Leu Met Ala Met Gly Val Lys Asp Phe Phe Thr Ser Leu Ala
        285                 290                 295

gat ctt tct ggc atc agc gct gcg ggg aat ctg tgc gct tcg gat gtc   1084
Asp Leu Ser Gly Ile Ser Ala Ala Gly Asn Leu Cys Ala Ser Asp Val
    300                 305                 310

atc cac aag gct ttt gtg gaa gtt aat gag gag ggc aca gag gct gca   1132
Ile His Lys Ala Phe Val Glu Val Asn Glu Glu Gly Thr Glu Ala Ala
315                 320                 325                 330

gct gcc act gcc ata ccc att atg ttg atg tgt gcg aga ttt cca cag   1180
Ala Ala Thr Ala Ile Pro Ile Met Leu Met Cys Ala Arg Phe Pro Gln
```

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                335                 340                 345

gtg gtg aac ttt ttc gtt gac cgc cca ttc atg ttc ttg atc cac agc   1228
Val Val Asn Phe Phe Val Asp Arg Pro Phe Met Phe Leu Ile His Ser
            350                 355                 360

cat gat cca gat gtt gtt ctc ttc atg gga tcc atc cgt gag ctc       1273
His Asp Pro Asp Val Val Leu Phe Met Gly Ser Ile Arg Glu Leu
        365                 370                 375

taaaaagcat attcttaacg gcggccaatc agtctgtgga gttatctctt agtcactaat 1333

gtgtaacaat tctgcaatat tcagcttgtg tatttcagta acttgctaga tctttgtgtt 1393

gttgatgtta ggcttcttgc g                                           1414


<210> 27
<211> 377
<212> PRT
<213> Ixodes ricinus

<400> 27
Met Glu Ala Ser Leu Ser Asn His Ile Leu Asn Phe Ser Val Asp Leu
  1               5                  10                  15

Tyr Lys Gln Leu Lys Pro Ser Gly Lys Asp Thr Ala Gly Asn Val Phe
             20                  25                  30

Cys Ser Pro Phe Ser Ile Ala Ala Ala Leu Ser Met Ala Leu Ala Gly
         35                  40                  45

Ala Arg Gly Asn Thr Ala Lys Gln Ile Ala Ala Ile Leu His Ser Asn
     50                  55                  60

Asp Asp Lys Ile His Asp His Phe Ser Asn Phe Leu Cys Lys Leu Pro
 65                  70                  75                  80

Ser Tyr Ala Pro Asp Val Ala Leu His Ile Ala Asn Arg Met Tyr Ser
                 85                  90                  95

Glu Gln Thr Phe His Pro Lys Ala Glu Tyr Thr Thr Leu Leu Gln Lys
            100                 105                 110

Ser Tyr Asp Ser Thr Ile Lys Ala Val Asp Phe Ala Gly Asn Ala Asp
        115                 120                 125

Arg Val Arg Leu Glu Val Asn Ala Trp Val Glu Glu Val Thr Arg Ser
    130                 135                 140

Lys Ile Arg Asp Leu Leu Ala Pro Gly Thr Val Asp Ser Ser Thr Ser
145                 150                 155                 160

Leu Ile Leu Val Asn Ala Ile Tyr Phe Lys Gly Leu Trp Asp Ser Gln
                165                 170                 175

Phe Lys Pro Ser Ala Thr Lys Pro Gly Asp Phe His Leu Thr Pro Gln
```

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          180                 185                 190

Thr Ser Lys Lys Val Asp Met Met His Gln Glu Gly Asp Phe Lys Met
        195                 200                 205

Gly His Cys Ser Asp Leu Lys Val Thr Ala Leu Glu Ile Pro Tyr Lys
    210                 215                 220

Gly Asn Lys Thr Ser Met Val Ile Leu Leu Pro Glu Asp Val Glu Gly
225                 230                 235                 240

Leu Ser Val Leu Glu Glu His Leu Thr Ala Pro Lys Leu Ser Ala Leu
                245                 250                 255

Leu Gly Gly Met Tyr Ala Thr Ser Asp Val Asn Leu Arg Leu Pro Lys
            260                 265                 270

Phe Lys Leu Glu Gln Ser Ile Gly Leu Lys Asp Val Leu Met Ala Met
        275                 280                 285

Gly Val Lys Asp Phe Phe Thr Ser Leu Ala Asp Leu Ser Gly Ile Ser
    290                 295                 300

Ala Ala Gly Asn Leu Cys Ala Ser Asp Val Ile His Lys Ala Phe Val
305                 310                 315                 320

Glu Val Asn Glu Glu Gly Thr Glu Ala Ala Ala Ala Thr Ala Ile Pro
                325                 330                 335

Ile Met Leu Met Cys Ala Arg Phe Pro Gln Val Val Asn Phe Phe Val
            340                 345                 350

Asp Arg Pro Phe Met Phe Leu Ile His Ser His Asp Pro Asp Val Val
        355                 360                 365

Leu Phe Met Gly Ser Ile Arg Glu Leu
    370                 375
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<210> 28
<211> 200
<212> DNA
<213> Ixodes ricinus

<400> 28
accgtaacca aaattgtttc tttccagaag aatggttcaa acttttcaaa cagatttcgg 60
aaactcttct tgcactttta aaatccaatc tacaatcttt cctcgcactt ctgaattgca 120
ttccagttta ccttccaagc aaacctcttt tggcaactcc agccgtactc catttcggca 180
taccacagtg catgcacttg 200

<210> 29
<211> 241
<212> DNA
<213> Ixodes ricinus

<400> 29
cgtattcttt gaagatttgt atacgaaaca taaattcgtc atgcatactt ttgatggtta 60
cacgacatgc gaagctgccg acaaagaaga ctgggaagat aagaagcacc tagttacggt 120
agtgcgtgga ccggataaac gaaagtacac gtttctacgc aacattctca ccttacaacg 180
gagagtgaga gttagcaaaa caatgattga gctcgtacgg aacatgtcct gtaggacatt 240
t 241

<210> 30
<211> 313
<212> DNA
<213> Ixodes ricinus

<220>
<221> misc_feature
<222> (1)...(313)
<223> n = A,T,C or G

<400> 30
aagcanccgg actacctgct tgaaaacgtt gtacgggcaa acttggacgg aaaactccca 60
gatgctactc cagttcctcc cggaagctac acgtacgctg agaatgataa cttcacctgc 120
tattccagaa gtacaccgtt tccggatggg gtgaatgttg tataacggct gctgggtgcg 180
gaagactatg atggattacg caaaaaagtt ctaaacgagt tgtttcccat cccggaaagt 240
ctgctgtatg ctgacatgat gcgacttgtg gctaagaaag acagagttga tcacactagt 300
ggatgacctg gga 313

<210> 31
<211> 2417
<212> DNA
<213> Ixodes ricinus

<220>
<221> CDS
<222> (218)..(1492)

<400> 31
gtcgtagtcg tagtcgtagt cagttgcgca tgcgcggggc tttcctgtct ttcttgcctt 60

tctgcagtcg ttcaccaaca tgtggataca gctccggaga tttgtaaaca aatactgcac 120

ttttaagcaa gacttgatat ttagatcgat atcctcctgt tgtccgtctt gattaatcgg 180

ctctttaggg tttttagaat aggcttttcg gtacgag atg ccc aaa gga aag agg 235
Met Pro Lys Gly Lys Arg
1 5

gga ccc aaa gca ggt ggc gcc gcg cgc ggt ggc cgg tgc gag gcc agc 283
Gly Pro Lys Ala Gly Gly Ala Ala Arg Gly Gly Arg Cys Glu Ala Ser
10 15 20

ctg gct ccg tcg tcc agc gac gag gag tcc aac gca gac acg gcg agc 331
Leu Ala Pro Ser Ser Ser Asp Glu Glu Ser Asn Ala Asp Thr Ala Ser
25 30 35

gtg ctg agc tgc gcc tcg gag tct cgc tgt ggc agt gac ggc acc gtt 379
Val Leu Ser Cys Ala Ser Glu Ser Arg Cys Gly Ser Asp Gly Thr Val

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     40                  45                  50

gga gac cca gaa gcg gag gag gct gtg ctg cat gac gac ttt gaa gac   427
Gly Asp Pro Glu Ala Glu Glu Ala Val Leu His Asp Asp Phe Glu Asp
 55                  60                  65                  70

aaa ctc aag gag gcc atc gac gga gct tcg cag aag agt gcc aaa gga   475
Lys Leu Lys Glu Ala Ile Asp Gly Ala Ser Gln Lys Ser Ala Lys Gly
                 75                  80                  85

cgg ctg tcg tgc ctg gag gcg att cgc aag gcc ttt tcc acc aaa tac   523
Arg Leu Ser Cys Leu Glu Ala Ile Arg Lys Ala Phe Ser Thr Lys Tyr
             90                  95                 100

ctg tac gac ttc ctc atg gac aga ccg agc acg gtg tgc gac ctg gtg   571
Leu Tyr Asp Phe Leu Met Asp Arg Pro Ser Thr Val Cys Asp Leu Val
        105                 110                 115

gag cgt ggg gtg cgc aag ggc cga ggg gag gag gcg gcc ctg tgc gcc   619
Glu Arg Gly Val Arg Lys Gly Arg Gly Glu Glu Ala Ala Leu Cys Ala
    120                 125                 130

act ctc ggg gcc ctg gcc tgc gtc cag ctc ggg gtc ggg gcc gag gcg   667
Thr Leu Gly Ala Leu Ala Cys Val Gln Leu Gly Val Gly Ala Glu Ala
135                 140                 145                 150

gac gcc ctg ttc gac gcc ctg cgc cag ccg ctc tgc act ttg ctg ctt   715
Asp Ala Leu Phe Asp Ala Leu Arg Gln Pro Leu Cys Thr Leu Leu Leu
                155                 160                 165

gac ggg gcc cag ggg ccc tcc ccc agg gcc agg tgt gcc act gcc ctc   763
Asp Gly Ala Gln Gly Pro Ser Pro Arg Ala Arg Cys Ala Thr Ala Leu
            170                 175                 180

ggc ctc tgc tgc ttc gtg gtg gac tcg gac aac cag ctg gtg ctg cag   811
Gly Leu Cys Cys Phe Val Val Asp Ser Asp Asn Gln Leu Val Leu Gln
        185                 190                 195

ccg tgc atg gag gtg ctc tgg cag gtg gtg ggt gcc aag gcg ggc ccc   859
Pro Cys Met Glu Val Leu Trp Gln Val Val Gly Ala Lys Ala Gly Pro
    200                 205                 210

ggc tct ccg gtg ctc cag gca gcg gcc ctg ctc gcc tgg ggc ctc ctg   907
Gly Ser Pro Val Leu Gln Ala Ala Ala Leu Leu Ala Trp Gly Leu Leu
215                 220                 225                 230

ctc agc gtg gct ccc gtc gac cgc ctg ctg gcg ctc acg cgc acg cac   955
Leu Ser Val Ala Pro Val Asp Arg Leu Leu Ala Leu Thr Arg Thr His
                235                 240                 245

ctg ccc cgg ctg cag gag ctg ctg gag agc ccc gac ctg gac ctg cgc   1003
Leu Pro Arg Leu Gln Glu Leu Leu Glu Ser Pro Asp Leu Asp Leu Arg
            250                 255                 260

att gcg gcc ggg gag gtg atc gcc gtc atg tac gag ggg gcc agg gac   1051
Ile Ala Ala Gly Glu Val Ile Ala Val Met Tyr Glu Gly Ala Arg Asp
        265                 270                 275
```

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tac gac gag gac ttt gag gag ccc tcg gag tcc ctg tgt gcc cag ctg   1099
Tyr Asp Glu Asp Phe Glu Glu Pro Ser Glu Ser Leu Cys Ala Gln Leu
    280                 285                 290

cgc cag ctg gcc acg gac agc cag aag ttt cgg gcc aag aag gag cgg   1147
Arg Gln Leu Ala Thr Asp Ser Gln Lys Phe Arg Ala Lys Lys Glu Arg
295                 300                 305                 310

cgc cag cag cgc tcc acc ttc agg gac gtc tac cgg gcc gtc agg gag   1195
Arg Gln Gln Arg Ser Thr Phe Arg Asp Val Tyr Arg Ala Val Arg Glu
                315                 320                 325

ggg gcc tct ccc gac gtg agc gtc aag ttt ggc cgg gaa gtc ctg gaa   1243
Gly Ala Ser Pro Asp Val Ser Val Lys Phe Gly Arg Glu Val Leu Glu
            330                 335                 340

ctg gac acc tgg agt cgc aag ctg cag tac gac gct ttc tgc cag ctg   1291
Leu Asp Thr Trp Ser Arg Lys Leu Gln Tyr Asp Ala Phe Cys Gln Leu
        345                 350                 355

ctg ggc tcc ggc atg aac ctg cac ctg gcc gtg aac gag ctg ctg agg   1339
Leu Gly Ser Gly Met Asn Leu His Leu Ala Val Asn Glu Leu Leu Arg
    360                 365                 370

gac atc ttt gaa ctg ggg cag gtg ctg gca acc gag gac cac att atc   1387
Asp Ile Phe Glu Leu Gly Gln Val Leu Ala Thr Glu Asp His Ile Ile
375                 380                 385                 390

tcc aag atc acc aag ttc gaa agg cac atg gtg aac atg gcc agc tgc   1435
Ser Lys Ile Thr Lys Phe Glu Arg His Met Val Asn Met Ala Ser Cys
                395                 400                 405

cgg gcc cgc acc aag aca cgc aac cgg ctg agg gac aag cgc gcc gac   1483
Arg Ala Arg Thr Lys Thr Arg Asn Arg Leu Arg Asp Lys Arg Ala Asp
            410                 415                 420

gtg gtc gcc tgaacctgcg gagggatgct tagctatgca ctcgccggcc           1532
Val Val Ala
        425

taccctggcg ggactcgatg ccactcacga gtcggcgctc gcaaattcgc cgcccatcgt 1592

tacgcaatgg gagacaaagc tgcttttggc attaccgttt gaggtcggct ccaacccata 1652

gatgaatttc ttttttgtgg ccgtttctgg gttacatgtt ttgggggaag ggagtggaac 1712

tgtccggttc tttggcacac gtcaggttgc tcttgatgcg cgacgtgctt gtatttgggt 1772

actgccgaca ccaagcgttt cggcgattcc tggaaaagag tgcctctcgc tcgacgtttg 1832

gttgttttct gcgtggtccg tcgtcgacct tcgttcgtcc aaagacgccg tccggtttca 1892

tactcccccc cgcacacata tcgaggccaa ttaaattgct aagggtgccg ttgtcgtgca 1952

tctggcaggc tcagaagtgg cttatttgtc ttttaatttt gccgatgcac gcaaaaattg 2012
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tcatttcttg aaagtttctc ttttattgcg tacacaattc aacttttatg taatttctga 2072

tggtctgttt tacgtgtgcg tgtgtaaaac gtaactttgg aagaattttt atgcacactg 2132

aacaaacgct cggtcctggg gttgaaagtg ctcggtgtgt gcatgagcta aagtgcaact 2192

gctttgttcc gaaggttttc tagtcgccga aatgtaccat tgtggacctt gttgcgagag 2252

accttggtct tctgggggag ctgctgtagc gtggcaagcc actattttgg gagcgacatt 2312

gcagagaaaa tcggctttta gaaaggcacc tgcgcggcga gtggacgttt tttcgtatat 2372

actgcgaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaa 2417

<210> 32
<211> 425
<212> PRT
<213> Ixodes ricinus

<400> 32

Met Pro Lys Gly Lys Arg Gly Pro Lys Ala Gly Gly Ala Ala Arg Gly
1 5 10 15

Gly Arg Cys Glu Ala Ser Leu Ala Pro Ser Ser Ser Asp Glu Glu Ser
20 25 30

Asn Ala Asp Thr Ala Ser Val Leu Ser Cys Ala Ser Glu Ser Arg Cys
35 40 45

Gly Ser Asp Gly Thr Val Gly Asp Pro Glu Ala Glu Glu Ala Val Leu
50 55 60

His Asp Asp Phe Glu Asp Lys Leu Lys Glu Ala Ile Asp Gly Ala Ser
65 70 75 80

Gln Lys Ser Ala Lys Gly Arg Leu Ser Cys Leu Glu Ala Ile Arg Lys
85 90 95

Ala Phe Ser Thr Lys Tyr Leu Tyr Asp Phe Leu Met Asp Arg Pro Ser
100 105 110

Thr Val Cys Asp Leu Val Glu Arg Gly Val Arg Lys Gly Arg Gly Glu
115 120 125

Glu Ala Ala Leu Cys Ala Thr Leu Gly Ala Leu Ala Cys Val Gln Leu
130 135 140

Gly Val Gly Ala Glu Ala Asp Ala Leu Phe Asp Ala Leu Arg Gln Pro
145 150 155 160

Leu Cys Thr Leu Leu Leu Asp Gly Ala Gln Gly Pro Ser Pro Arg Ala
165 170 175

Arg Cys Ala Thr Ala Leu Gly Leu Cys Cys Phe Val Val Asp Ser Asp
180 185 190

```
Asn Gln Leu Val Leu Gln Pro Cys Met Glu Val Leu Trp Gln Val Val
        195                 200                 205

Gly Ala Lys Ala Gly Pro Gly Ser Pro Val Leu Gln Ala Ala Ala Leu
    210                 215                 220

Leu Ala Trp Gly Leu Leu Leu Ser Val Ala Pro Val Asp Arg Leu Leu
225                 230                 235                 240

Ala Leu Thr Arg Thr His Leu Pro Arg Leu Gln Glu Leu Leu Glu Ser
                245                 250                 255

Pro Asp Leu Asp Leu Arg Ile Ala Ala Gly Glu Val Ile Ala Val Met
            260                 265                 270

Tyr Glu Gly Ala Arg Asp Tyr Asp Glu Asp Phe Glu Glu Pro Ser Glu
        275                 280                 285

Ser Leu Cys Ala Gln Leu Arg Gln Leu Ala Thr Asp Ser Gln Lys Phe
    290                 295                 300

Arg Ala Lys Lys Glu Arg Arg Gln Gln Arg Ser Thr Phe Arg Asp Val
305                 310                 315                 320

Tyr Arg Ala Val Arg Glu Gly Ala Ser Pro Asp Val Ser Val Lys Phe
                325                 330                 335

Gly Arg Glu Val Leu Glu Leu Asp Thr Trp Ser Arg Lys Leu Gln Tyr
            340                 345                 350

Asp Ala Phe Cys Gln Leu Leu Gly Ser Gly Met Asn Leu His Leu Ala
        355                 360                 365

Val Asn Glu Leu Leu Arg Asp Ile Phe Glu Leu Gly Gln Val Leu Ala
    370                 375                 380

Thr Glu Asp His Ile Ile Ser Lys Ile Thr Lys Phe Glu Arg His Met
385                 390                 395                 400

Val Asn Met Ala Ser Cys Arg Ala Arg Thr Lys Thr Arg Asn Arg Leu
                405                 410                 415

Arg Asp Lys Arg Ala Asp Val Val Ala
            420                 425
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<210> 33
<211> 933
<212> DNA
<213> Ixodes ricinus

<220>
<221> CDS
<222> (32)..(850)

<400> 33

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gattgggaac ctcctattcc tcacttgaaa c atg gct gga ctc cgc tcc tgc    52
                                    Met Ala Gly Leu Arg Ser Cys
                                      1               5

atc ctc ctg gct ctt gcc act agt gcc ttc gcc ggc tac ctt cac ggt   100
Ile Leu Leu Ala Leu Ala Thr Ser Ala Phe Ala Gly Tyr Leu His Gly
         10                  15                  20

ggc ctt acc cac ggc gct ggg tac ggt tac ggt gtc ggc tac ggt tcc   148
Gly Leu Thr His Gly Ala Gly Tyr Gly Tyr Gly Val Gly Tyr Gly Ser
     25                  30                  35

ggc ctt ggc tat ggc ctt ggc tac ggt tcc ggc ctt ggc tat gga cat   196
Gly Leu Gly Tyr Gly Leu Gly Tyr Gly Ser Gly Leu Gly Tyr Gly His
 40                  45                  50                  55

gct gtt ggc ctt gga cac ggc ttt ggc tat tct ggt ctg acc ggc tac   244
Ala Val Gly Leu Gly His Gly Phe Gly Tyr Ser Gly Leu Thr Gly Tyr
                 60                  65                  70

agt gtg gct gcc cca gct agc tac gcc gtt gct gct cca gcc gtc agc   292
Ser Val Ala Ala Pro Ala Ser Tyr Ala Val Ala Ala Pro Ala Val Ser
             75                  80                  85

cgc acc gtt tcc act tac cac gct gct cca gct gtg gcc acc tac gcc   340
Arg Thr Val Ser Thr Tyr His Ala Ala Pro Ala Val Ala Thr Tyr Ala
         90                  95                 100

gct gct cct gtc gcc acc tat gct gtt gct cca gct gtc act agg gtt   388
Ala Ala Pro Val Ala Thr Tyr Ala Val Ala Pro Ala Val Thr Arg Val
    105                 110                 115

tcc ccc gtt cgc gcc gcc cca gct gtg gcc acg tac gcc gcc gct cca   436
Ser Pro Val Arg Ala Ala Pro Ala Val Ala Thr Tyr Ala Ala Ala Pro
120                 125                 130                 135

gtc gcc acc tac gcc gct gct cca gct gtg acc agg gtg tcc acc att   484
Val Ala Thr Tyr Ala Ala Ala Pro Ala Val Thr Arg Val Ser Thr Ile
                140                 145                 150

cac gct gcc ccg gct gtg gcc aat tac gcc gtc gct cca gtc gcc acc   532
His Ala Ala Pro Ala Val Ala Asn Tyr Ala Val Ala Pro Val Ala Thr
            155                 160                 165

tat gcc gct gct cca gct gtg acc agg gtg tcc acc atc cac gcc gct   580
Tyr Ala Ala Ala Pro Ala Val Thr Arg Val Ser Thr Ile His Ala Ala
        170                 175                 180

cca gcc gtg gct agc tac cag acc tac cac gct cca gct gtc gcc act   628
Pro Ala Val Ala Ser Tyr Gln Thr Tyr His Ala Pro Ala Val Ala Thr
    185                 190                 195

gtg gct cat gct cca gct gtg gcc agc tac cag acc tac cac gct gcc   676
Val Ala His Ala Pro Ala Val Ala Ser Tyr Gln Thr Tyr His Ala Ala
200                 205                 210                 215

cca gcc gtg gct acc tac gcc cat gcc gct ccc gtc tac ggc tat ggt   724
```

```
Pro Ala Val Ala Thr Tyr Ala His Ala Ala Pro Val Tyr Gly Tyr Gly
                220                 225                 230

gtc ggt acc ctc gga tat ggt gtc ggc cac tac ggc tac gga cac ggt   772
Val Gly Thr Leu Gly Tyr Gly Val Gly His Tyr Gly Tyr Gly His Gly
            235                 240                 245

ctt ggc agc tac ggc ctg aac tac ggt tac ggc ctc ggc acc tac ggt   820
Leu Gly Ser Tyr Gly Leu Asn Tyr Gly Tyr Gly Leu Gly Thr Tyr Gly
        250                 255                 260

gac tac acc acc ctt ctc cgc aag aag aag taaatggcac atctcaagag     870
Asp Tyr Thr Thr Leu Leu Arg Lys Lys Lys
    265                 270

agcccattgg actgccatcg acattcttct tcaataaaag agcccgaaga tggcattatt 930

ttt                                                               933


<210> 34
<211> 273
<212> PRT
<213> Ixodes ricinus

<400> 34
Met Ala Gly Leu Arg Ser Cys Ile Leu Leu Ala Leu Ala Thr Ser Ala
  1               5                  10                  15

Phe Ala Gly Tyr Leu His Gly Gly Leu Thr His Gly Ala Gly Tyr Gly
             20                  25                  30

Tyr Gly Val Gly Tyr Gly Ser Gly Leu Gly Tyr Gly Leu Gly Tyr Gly
         35                  40                  45

Ser Gly Leu Gly Tyr Gly His Ala Val Gly Leu Gly His Gly Phe Gly
     50                  55                  60

Tyr Ser Gly Leu Thr Gly Tyr Ser Val Ala Ala Pro Ala Ser Tyr Ala
 65                  70                  75                  80

Val Ala Ala Pro Ala Val Ser Arg Thr Val Ser Thr Tyr His Ala Ala
                 85                  90                  95

Pro Ala Val Ala Thr Tyr Ala Ala Ala Pro Val Ala Thr Tyr Ala Val
            100                 105                 110

Ala Pro Ala Val Thr Arg Val Ser Pro Val Arg Ala Ala Pro Ala Val
        115                 120                 125

Ala Thr Tyr Ala Ala Ala Pro Val Ala Thr Tyr Ala Ala Ala Pro Ala
    130                 135                 140

Val Thr Arg Val Ser Thr Ile His Ala Ala Pro Ala Val Ala Asn Tyr
145                 150                 155                 160

Ala Val Ala Pro Val Ala Thr Tyr Ala Ala Ala Pro Ala Val Thr Arg
```

165 170 175

Val Ser Thr Ile His Ala Ala Pro Ala Val Ala Ser Tyr Gln Thr Tyr
180 185 190

His Ala Pro Ala Val Ala Thr Val Ala His Ala Pro Ala Val Ala Ser
195 200 205

Tyr Gln Thr Tyr His Ala Ala Pro Ala Val Ala Thr Tyr Ala His Ala
210 215 220

Ala Pro Val Tyr Gly Tyr Gly Val Gly Thr Leu Gly Tyr Gly Val Gly
225 230 235 240

His Tyr Gly Tyr Gly His Gly Leu Gly Ser Tyr Gly Leu Asn Tyr Gly
245 250 255

Tyr Gly Leu Gly Thr Tyr Gly Asp Tyr Thr Thr Leu Leu Arg Lys Lys
260 265 270

Lys